



Cenovus Energy Inc.
Christina Lake In-situ Progress Report
Scheme 8591
2020 update

June 30, 2021

Oil & gas and financial information

Oil & gas information

The estimates of reserves were prepared effective December 31, 2020. All estimates of reserves were prepared by independent qualified reserves evaluators, based on definitions contained in the Canadian Oil and Gas Evaluation Handbook and in accordance with National Instrument 51-101 *Standards of Disclosure for Oil and Gas Activities*. Additional information with respect to pricing and additional reserves and other oil and gas information, including the material risks and uncertainties associated with reserves estimates, is contained in our AIF and Form 40-F for the year ended December 31, 2020 available on SEDAR at www.sedar.com, EDGAR at www.sec.gov and on our website at cenovus.com.

Certain natural gas volumes have been converted to barrels of oil equivalent (BOE) on the basis of one barrel (bbl) to six thousand cubic feet (Mcf). BOE may be misleading, particularly if used in isolation. A conversion ratio of one bbl to six Mcf is based on an energy equivalency conversion method primarily applicable at the burner tip and does not represent value equivalency at the well head.

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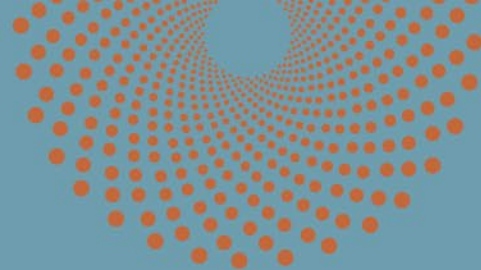
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Advisory

This presentation contains information in compliance with:

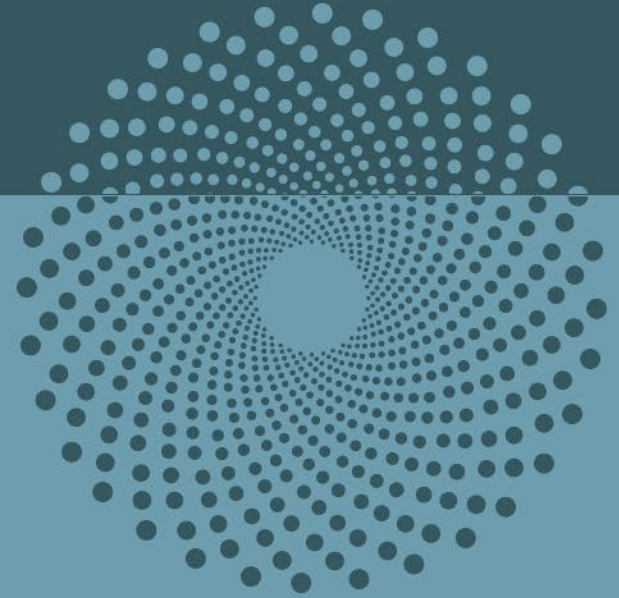
AER Directive 054 - Performance Presentations, Auditing, and Surveillance of In Situ Oil Sands Schemes

This document contains forward-looking information prepared and submitted pursuant to Alberta regulatory requirements and is not intended to be relied upon for the purpose of making investment decisions, including without limitation, to purchase, hold or sell any securities of Cenovus Energy Inc.



Subsection 4.1 1

Introduction



Cenovus at a glance

TSX, NYSE | CVE

2021E production	755 MBOE/d
<i>Oil Sands</i>	<i>555 Mbbls/d</i>
<i>Conventional</i>	<i>140 MBOE/d</i>
<i>Offshore</i>	<i>70 MBOE/d</i>

Upgrading and refining capacity	660 Mbbls/d
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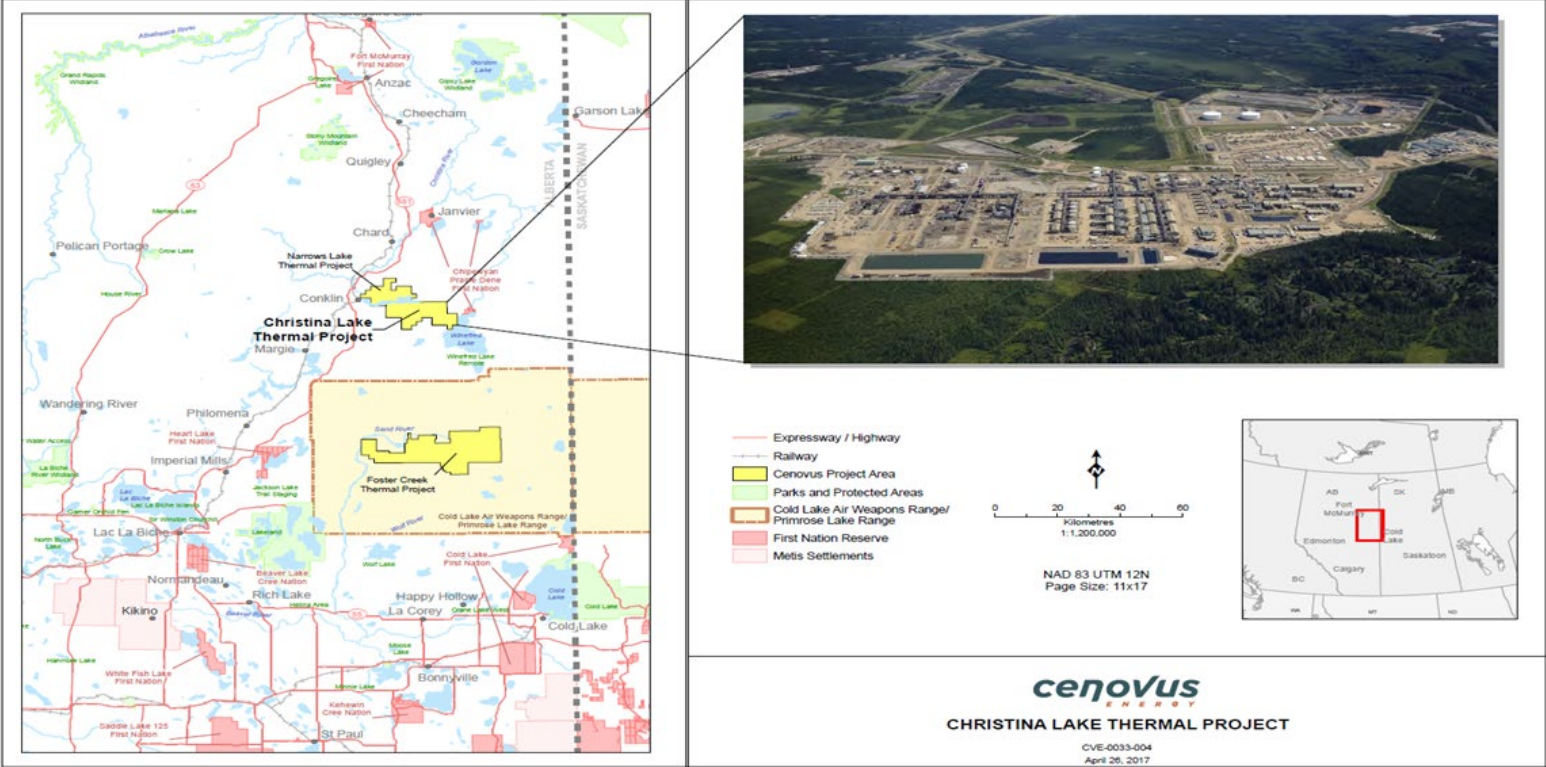
2020 proved & probable reserves	8.4 BBOE
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Reserves life index	30+ years
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Note: Values are approximate. Forecasted production based on the midpoint of January 28, 2021 guidance. Refining capacity represents net capacity to Cenovus. See Advisory.



Area map



cenovus
ENERGY

CHRISTINA LAKE THERMAL PROJECT

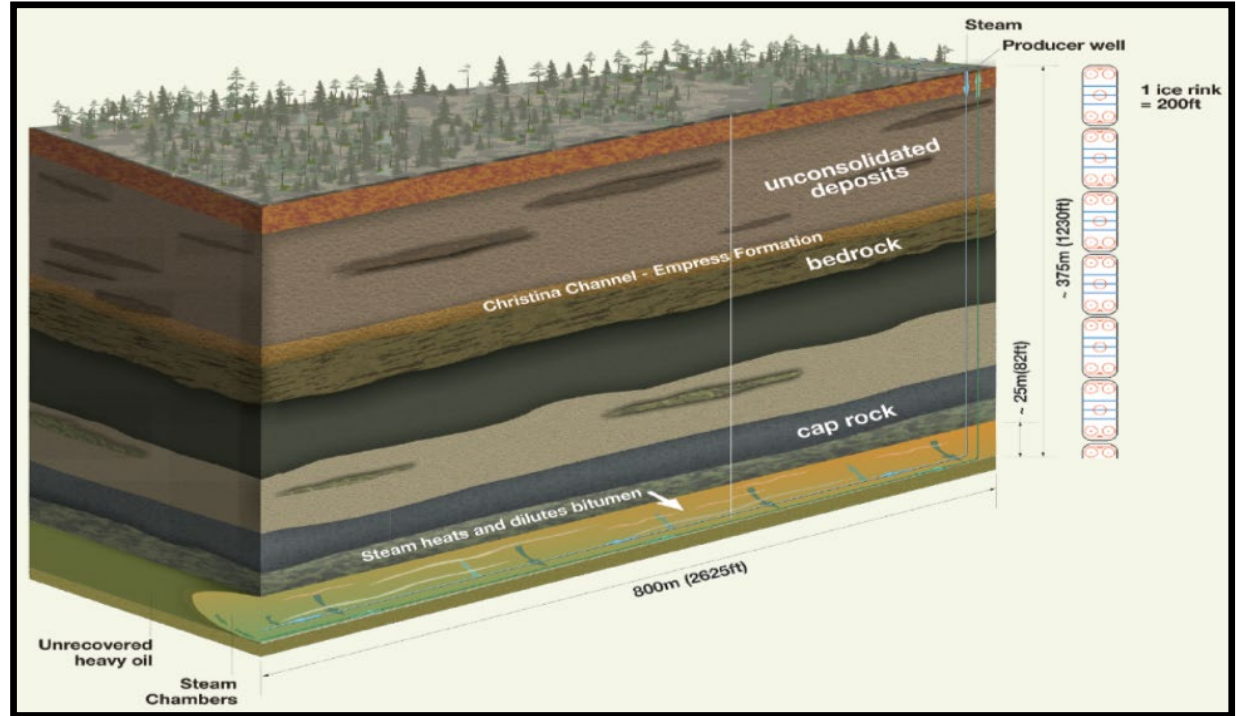
CVE-0033-004
April 26, 2017

Recovery process

Christina Lake Thermal Project

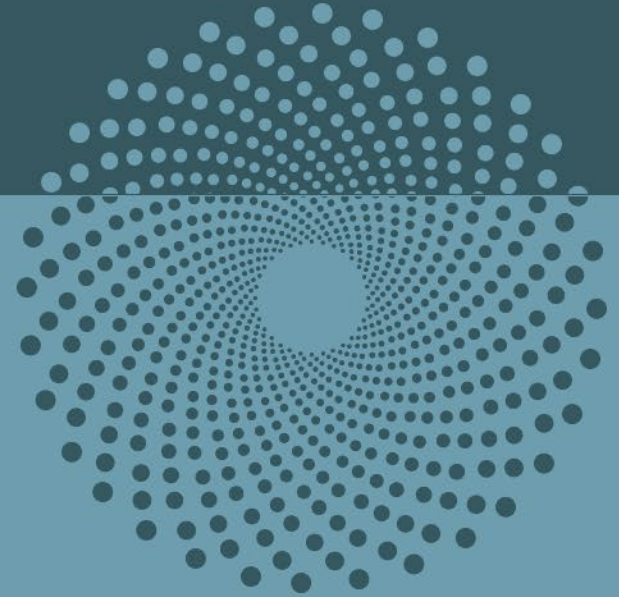
Uses the dual-horizontal well SAGD (steam-assisted gravity drainage) process to recover oil from the McMurray formation

- Two horizontal wells one above the other approximately 5 m apart
- Steam is injected into the upper well where it heats the oil and allows it to drain into the lower well
- Oil and water emulsion pumped to the surface and treated

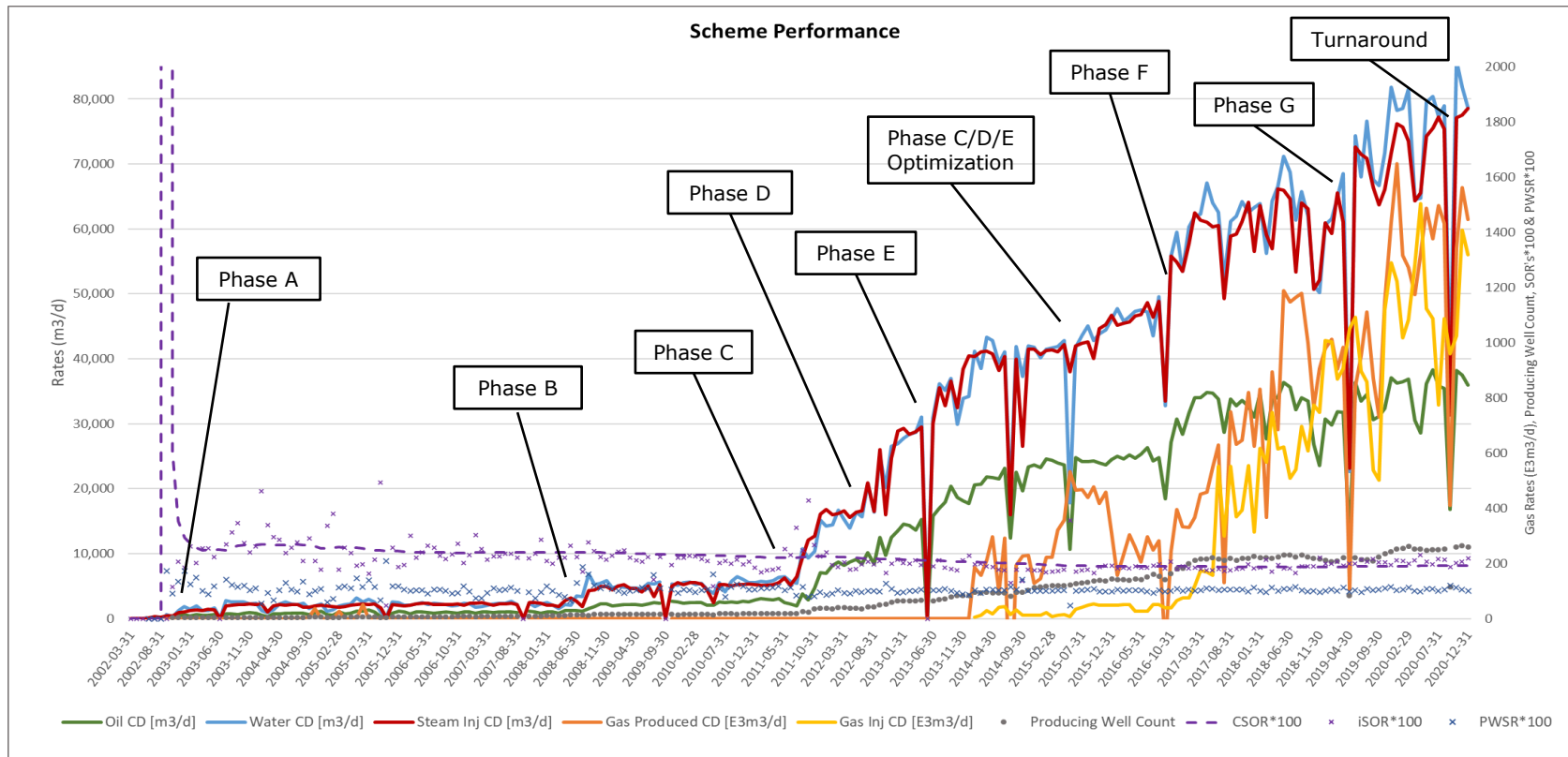


Subsection 4.2 2-7

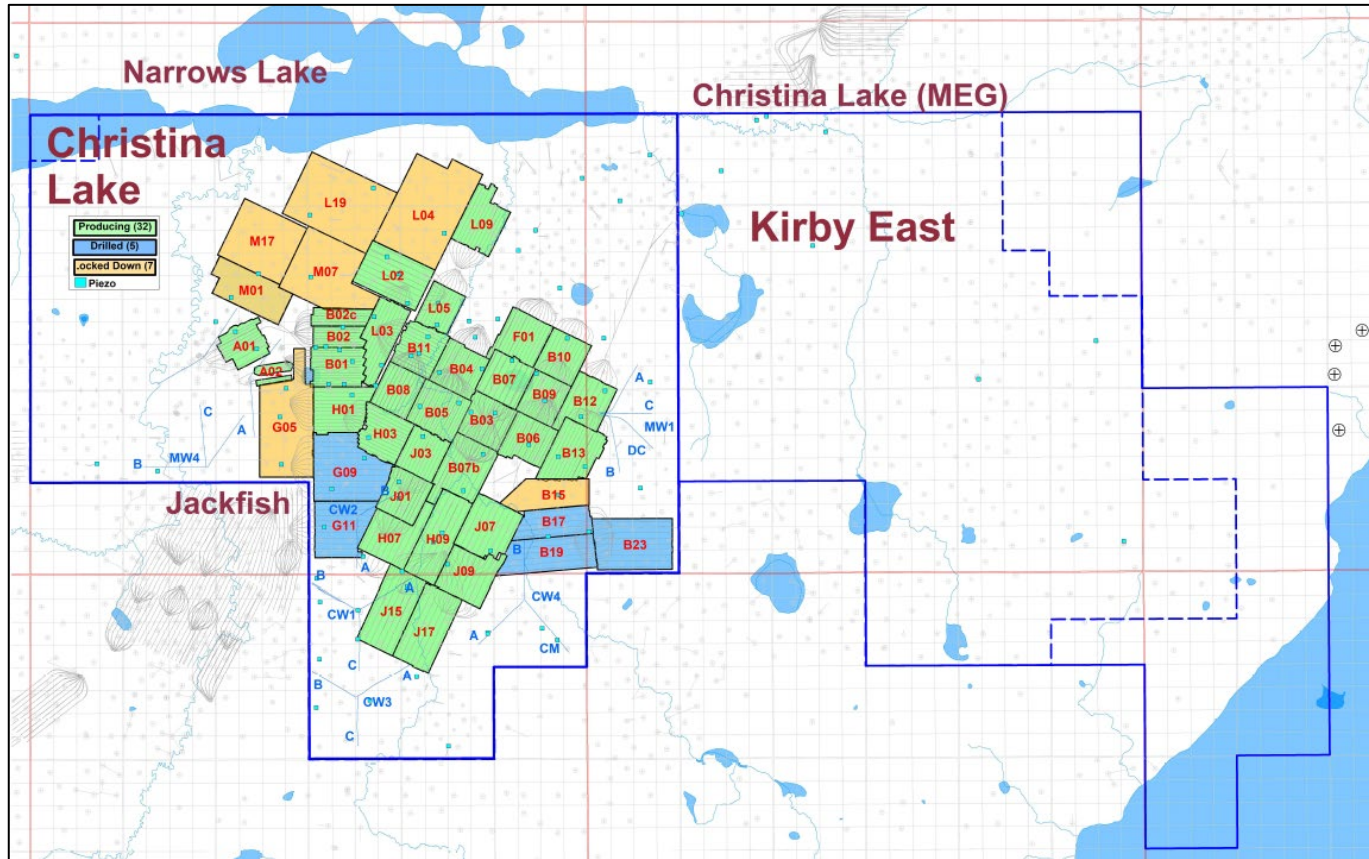
Subsurface



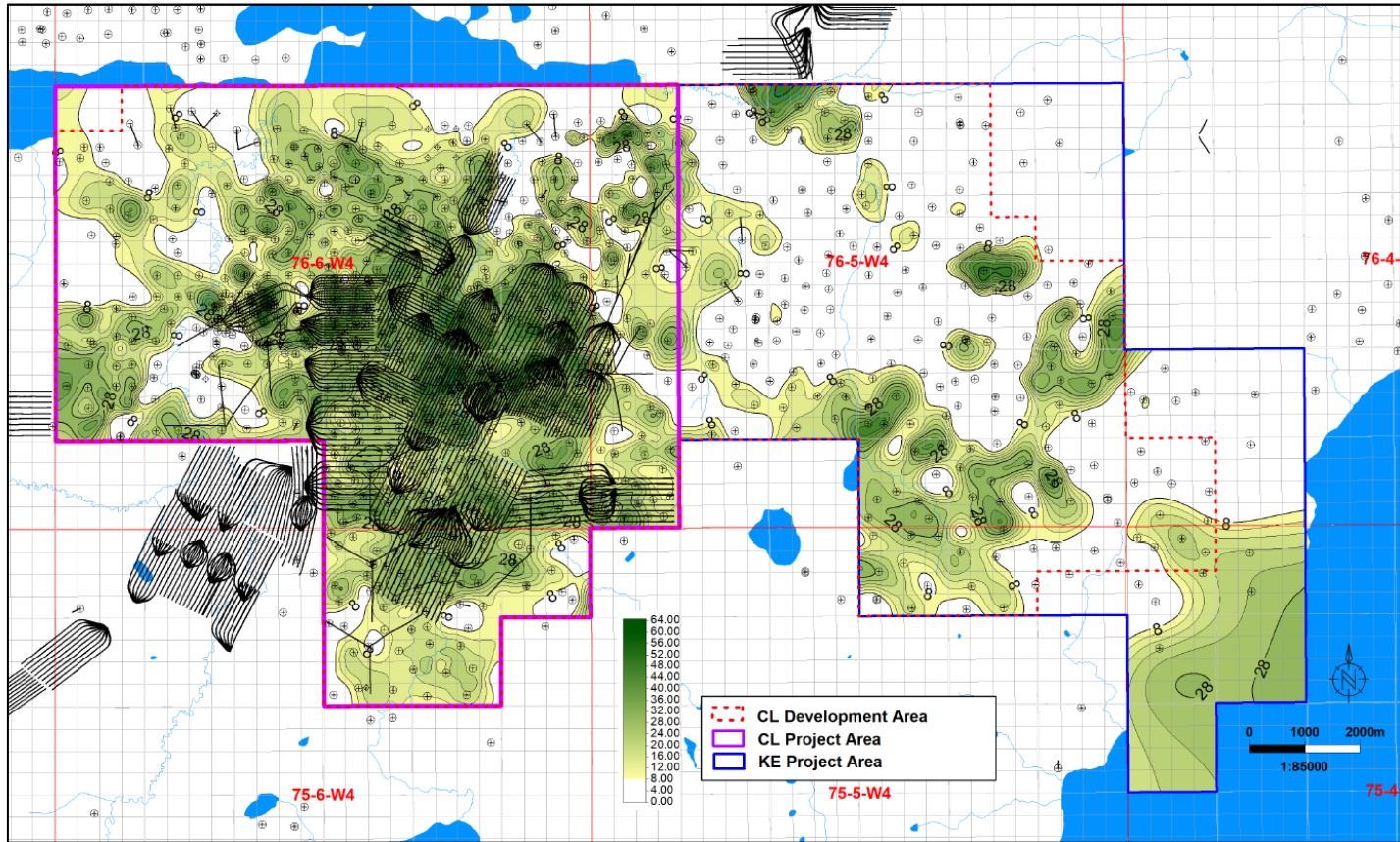
Performance: full historical



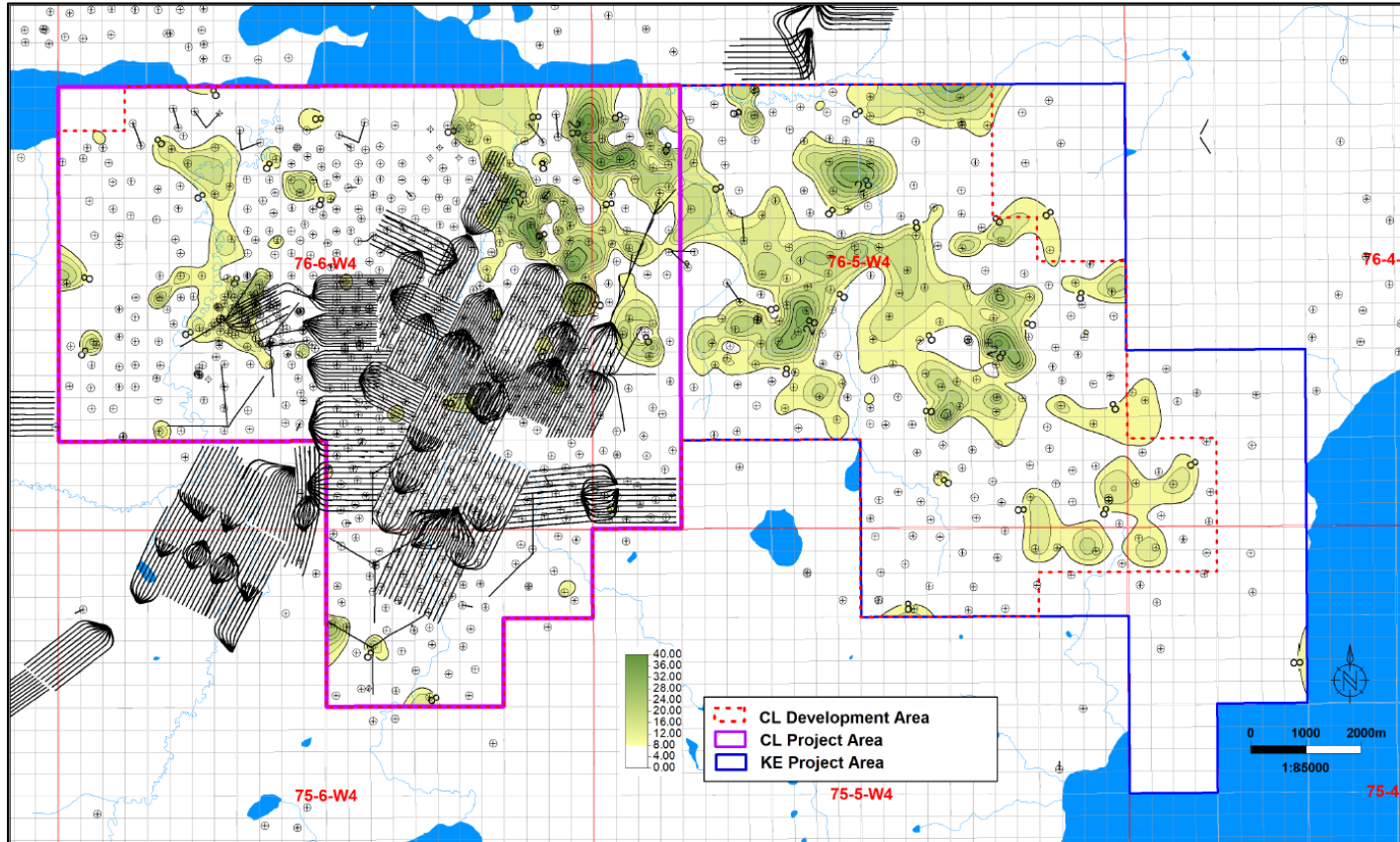
Scheme Map: Christina Lake



SAGD Pay Isopach Map (Main Zone)



SAGD Pay Isopach Map (Upper Zone)

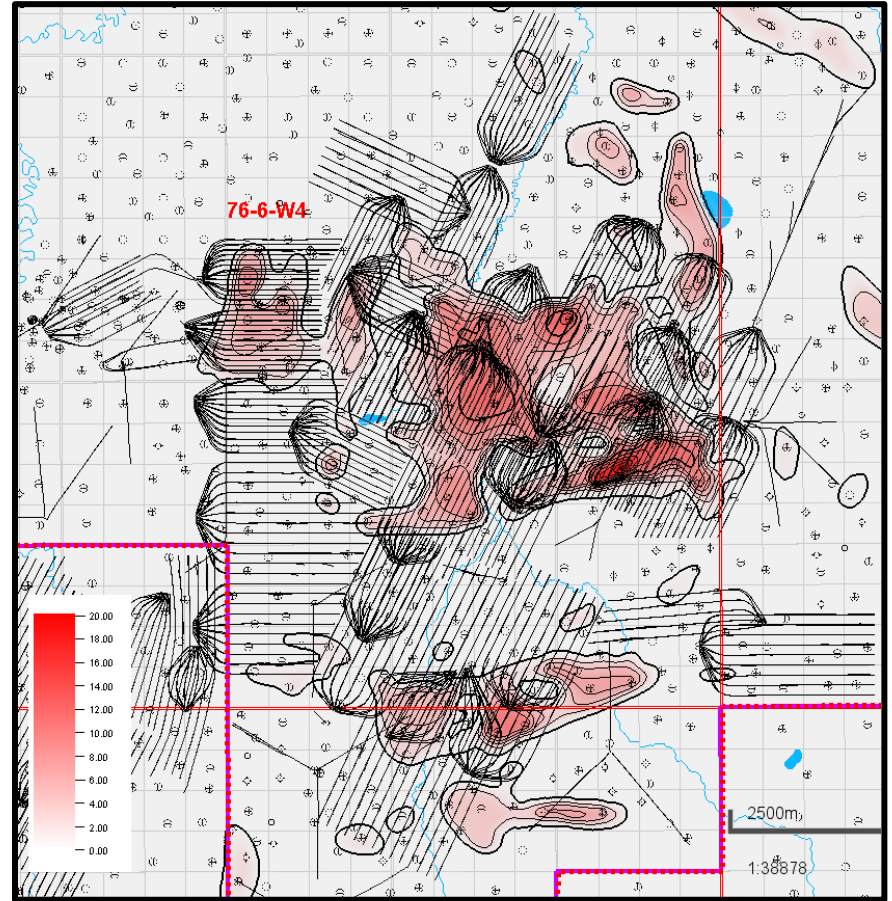


SAGD Top Gas Isopach

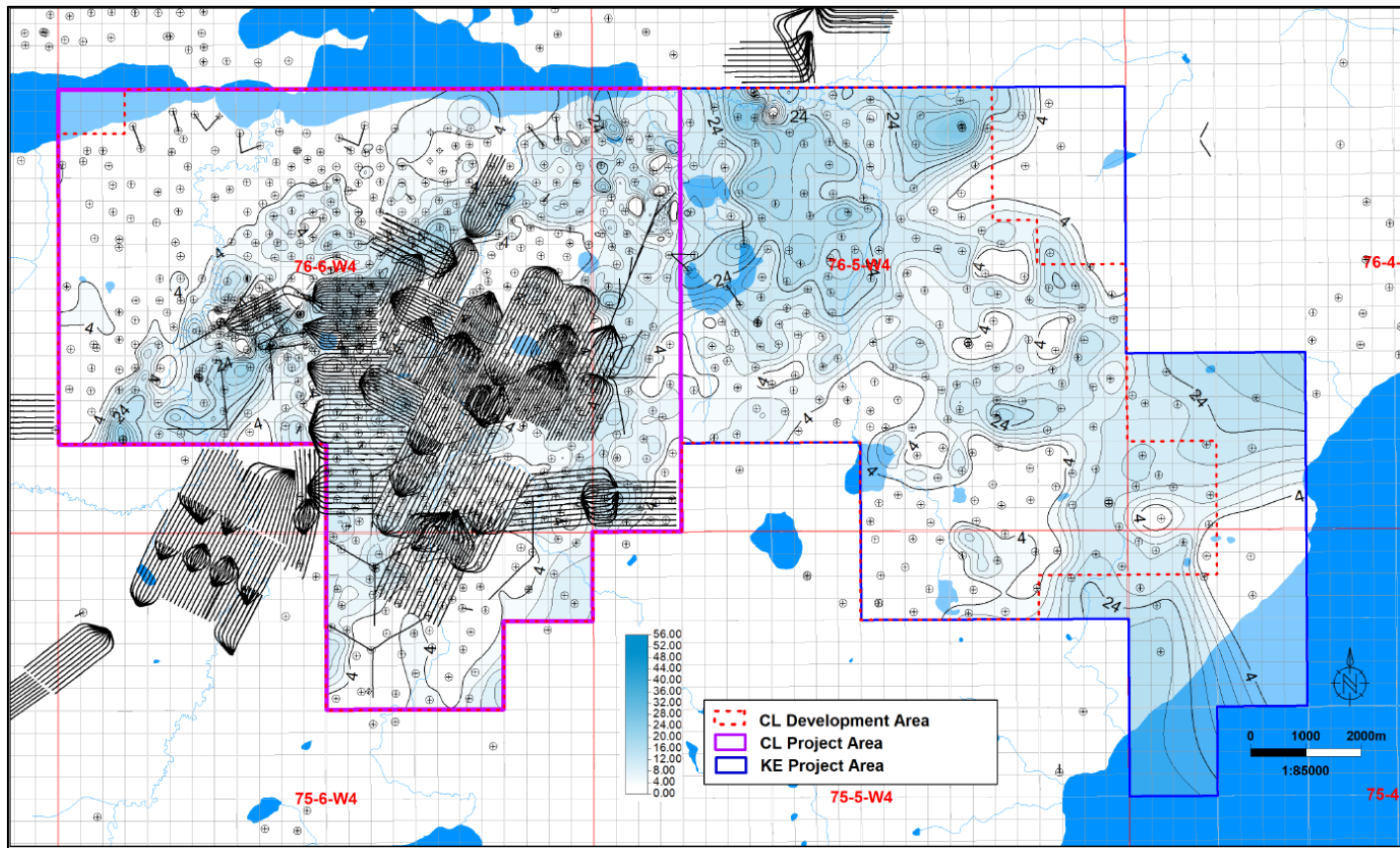
(2m contour interval)

3 main gas pockets:

- **'Sec 15'**
 - centered over Section 15
- **'11-14'**
 - centered over Section 11
- **'Southern'**
 - centered over Section 2



McMurray Water Isopach Map

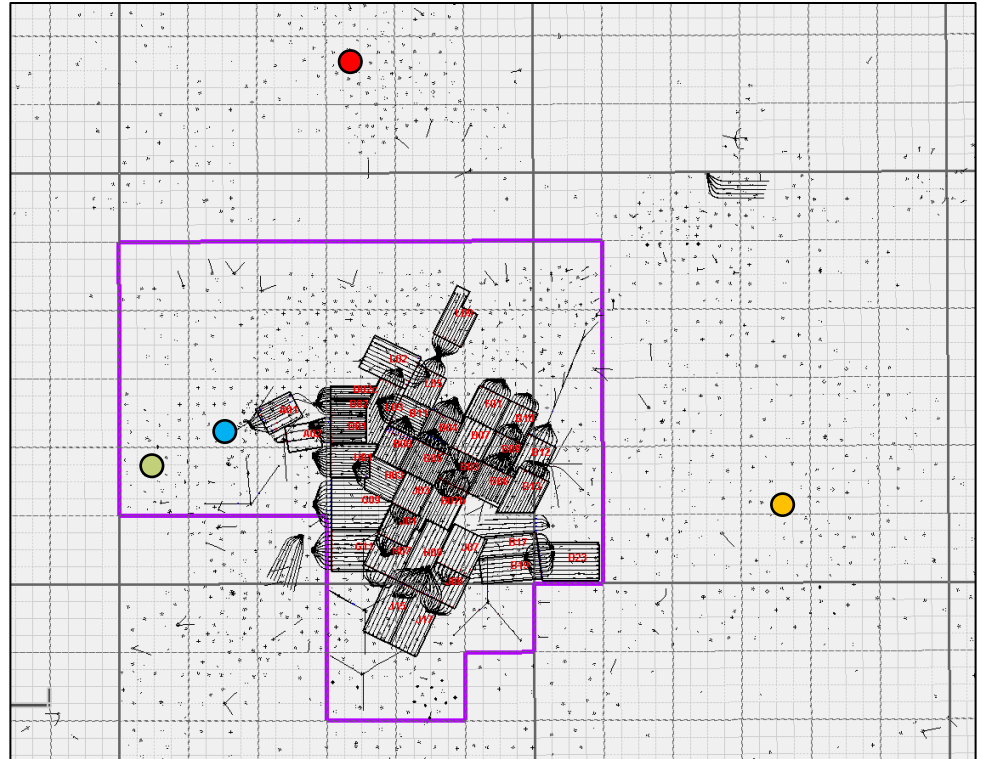


DFIT Wells

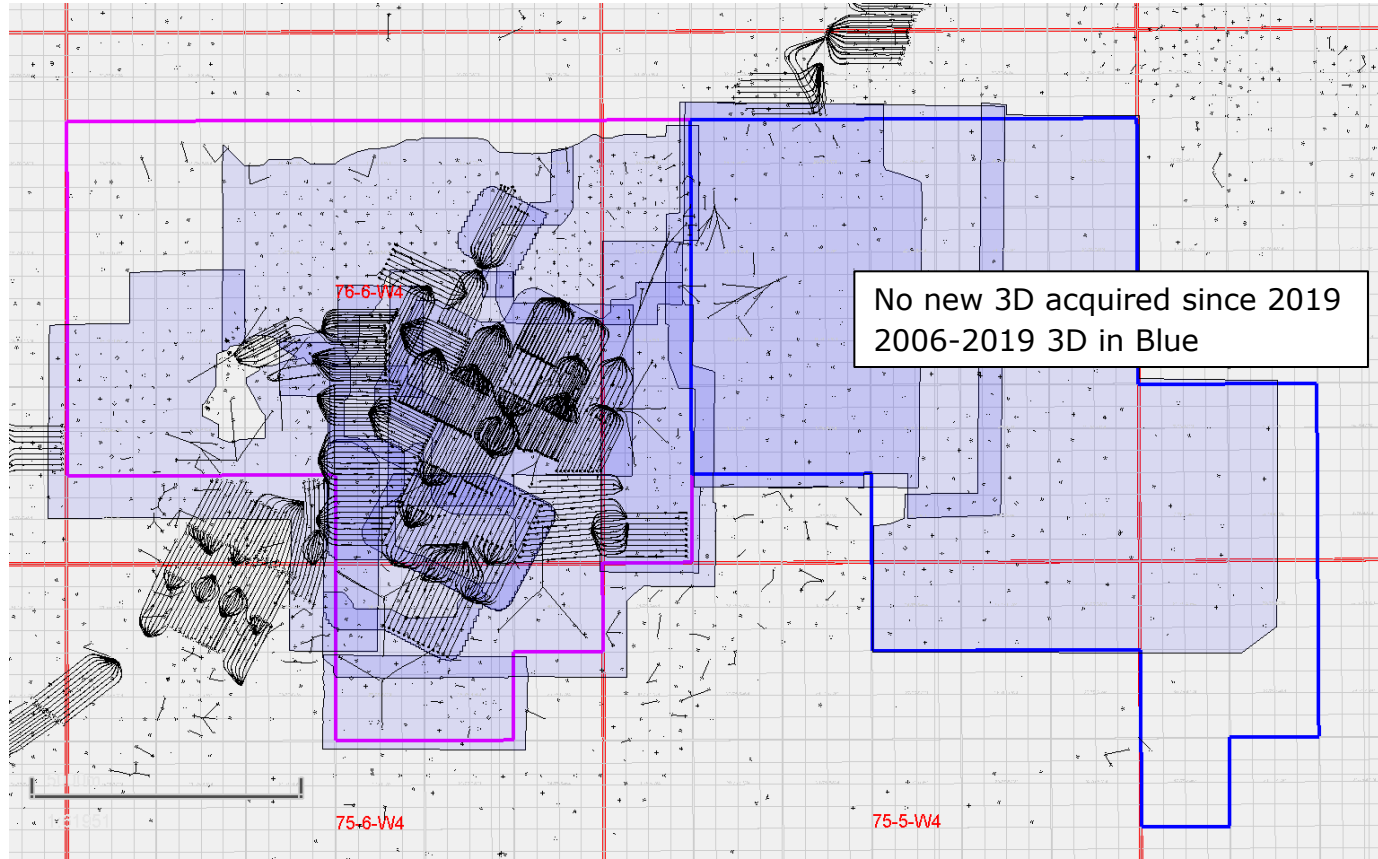
- CVE recognizes that tensile and shear failure are two possible ways for integrity to be compromised
- DFIT data gives insight about failure mechanisms and stress magnitudes.

- ● CVE FCCL 7-17-76-6w4
- ● CVE FCCL C2 HARDY 2-10-76-5
- ● CVE FCCL C11 HARDY 11-10-77-6
- ● CVE FCCL C10 LEISMER 10-7-76-6W4*

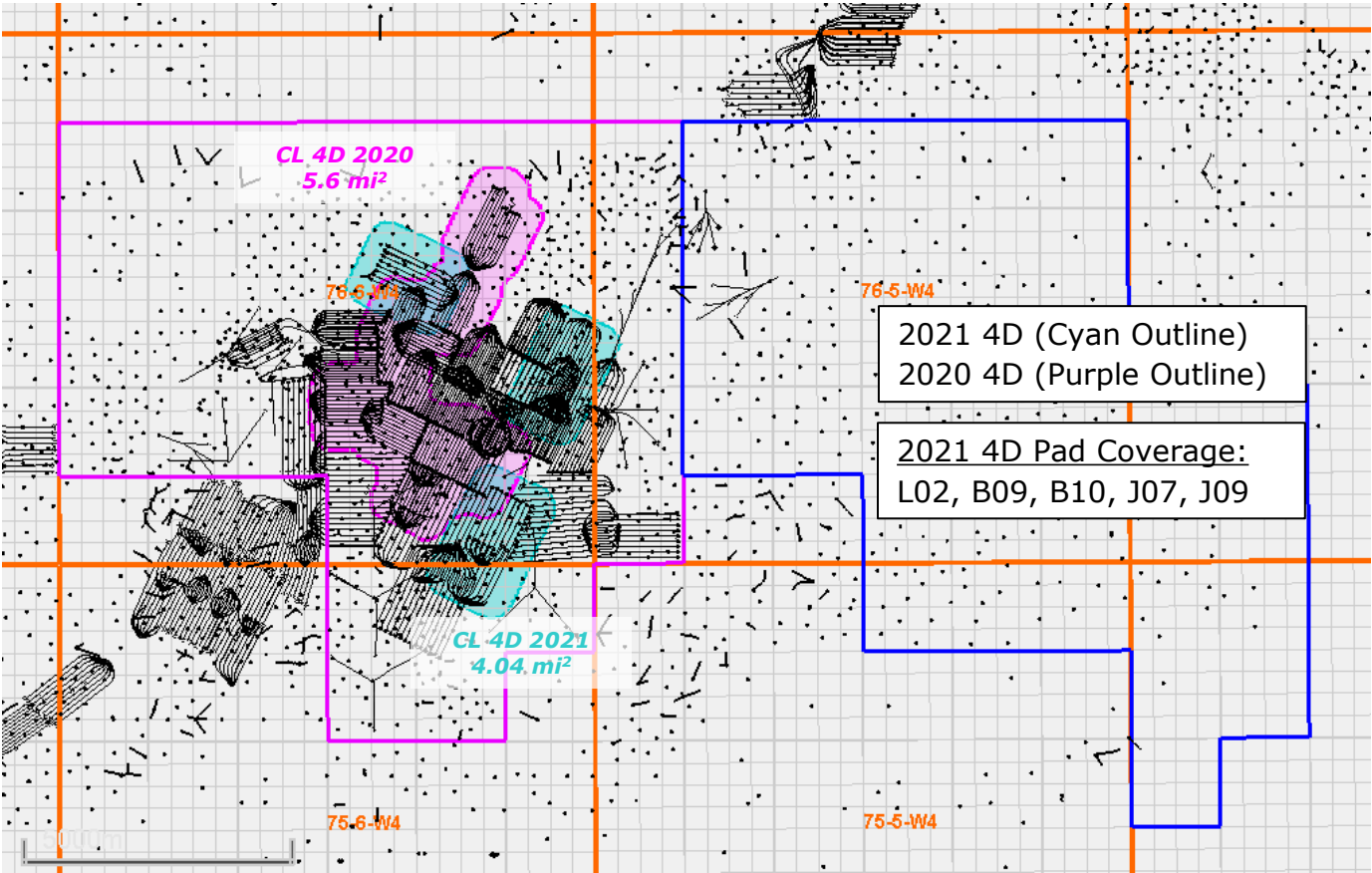
* This well was drilled in 2018. T21 is the caprock. Tested @328.25m, Closure Pressure 17.70 kPa/m



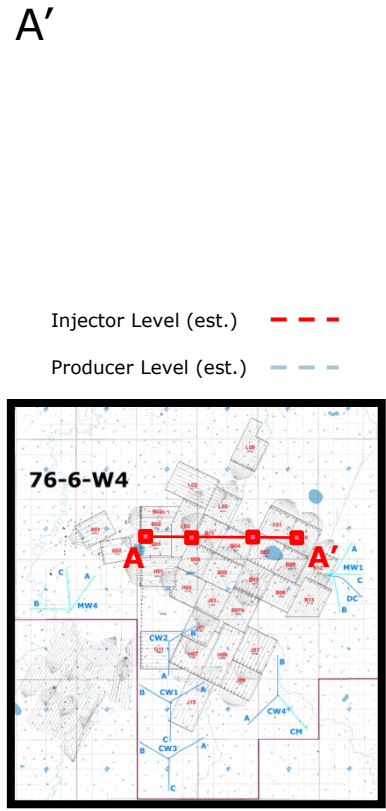
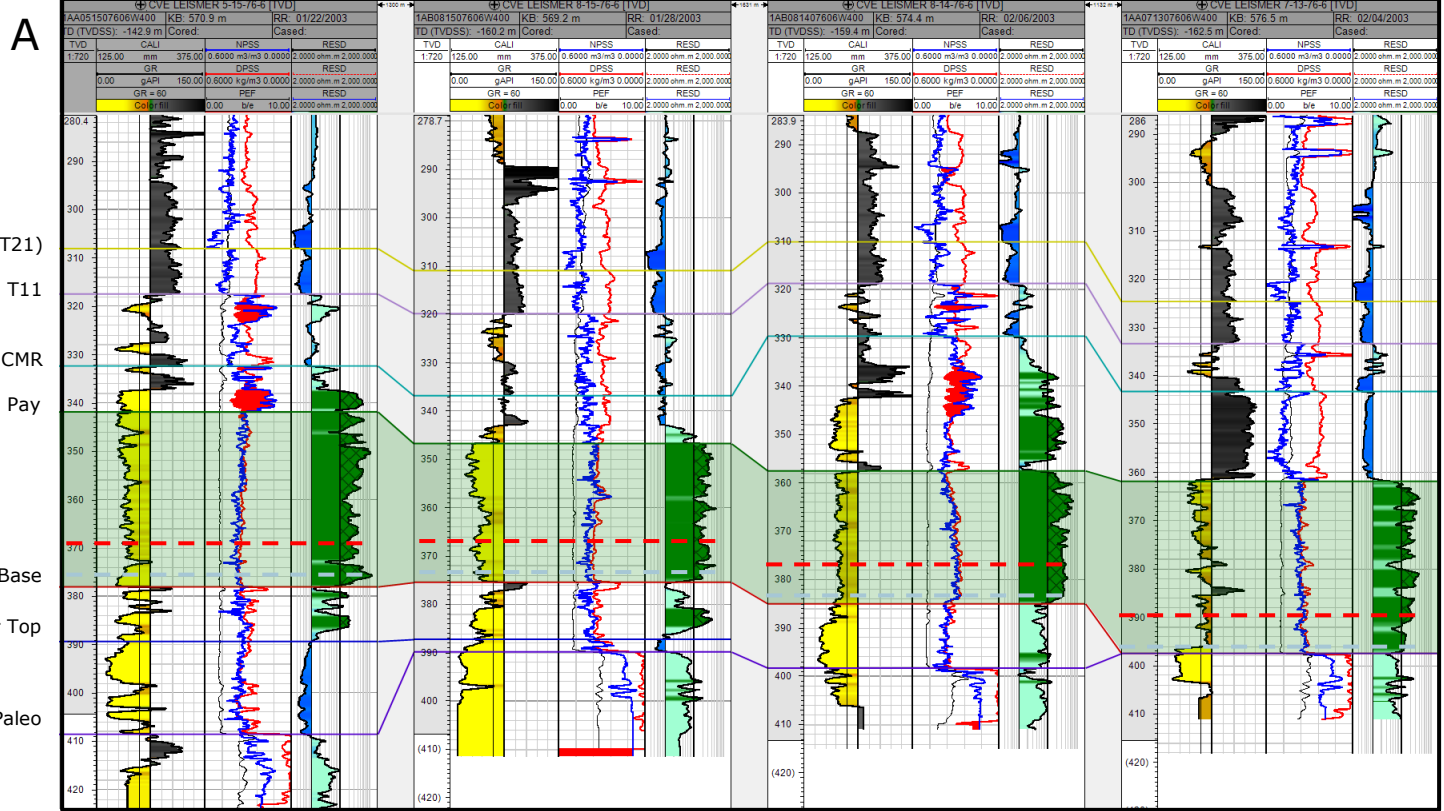
3D Seismic within Project Area



4D Seismic within Project Area



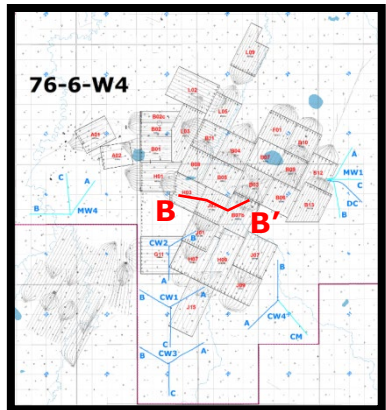
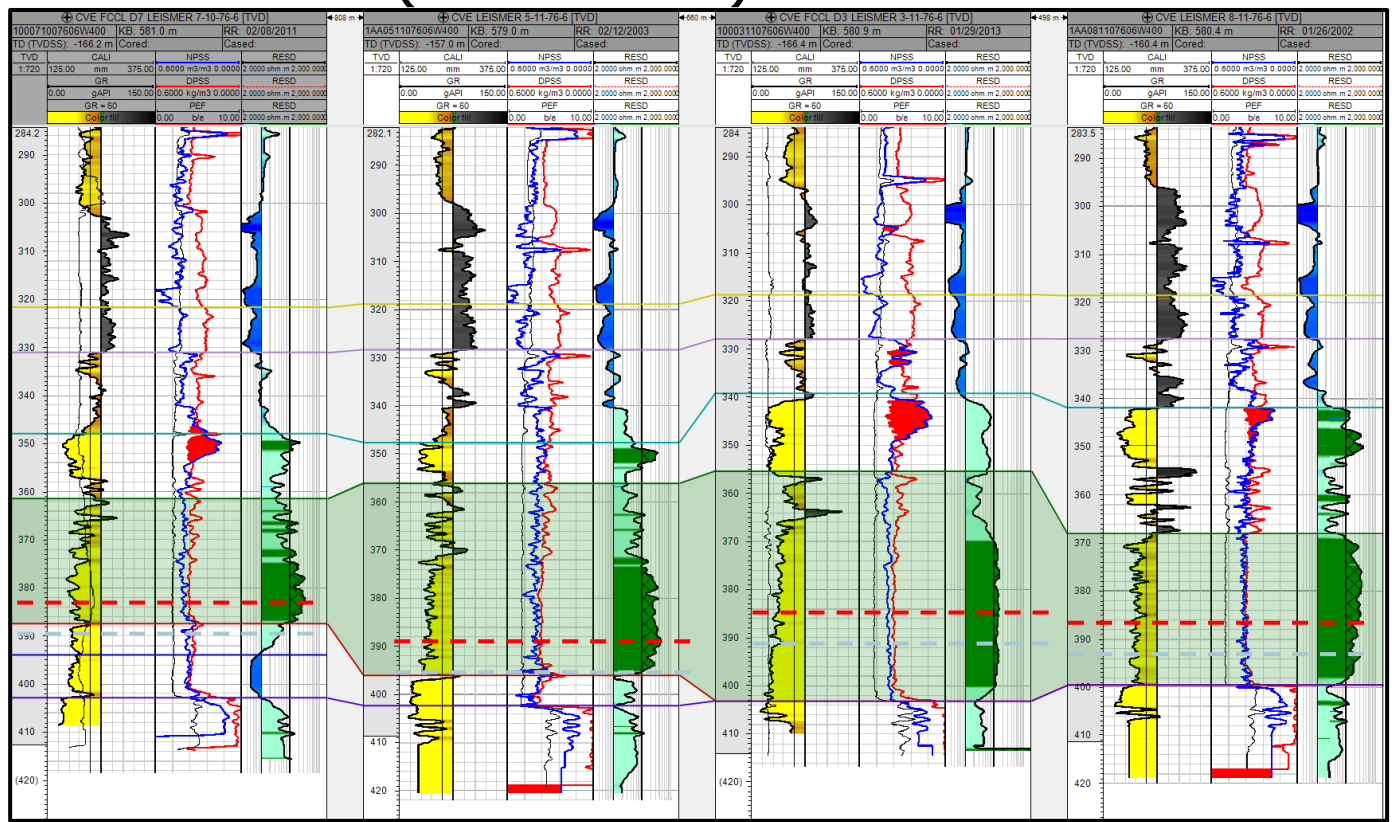
Cross-section (structural): north



Cross-section (structural): mid

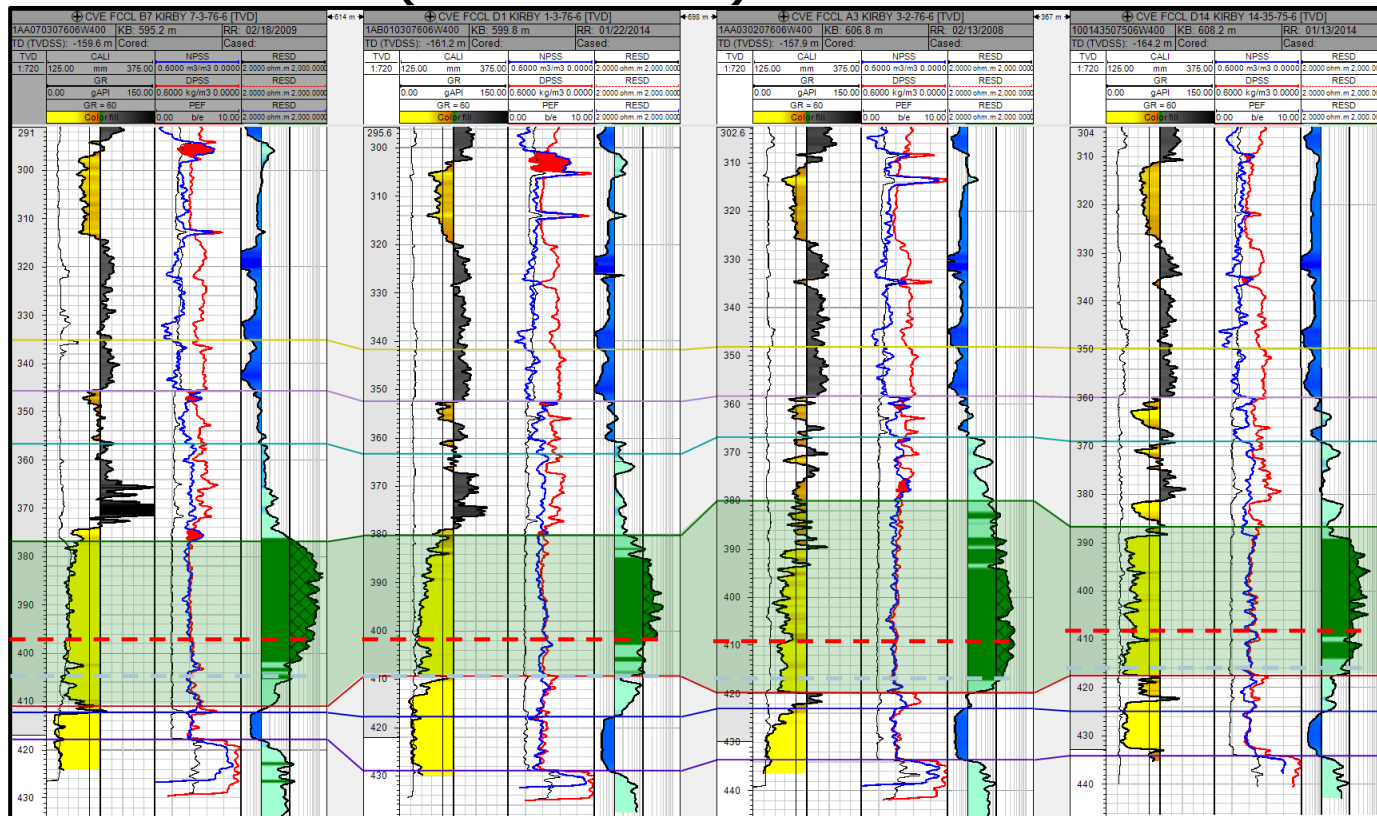
B

B'

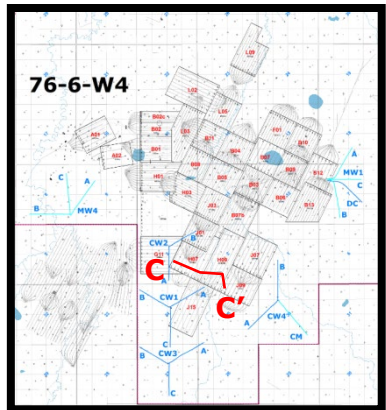


Cross-section (structural): south

C



C'



OBIP Volumes

- Project Area OBIP
 - 776 MMm³
- Development Area OBIP
 - 767 MMm³
- Combined Active Well Patterns OBIP
 - 182 MMm³
- Cumulative % Recovery
 - 50%

Reservoir properties

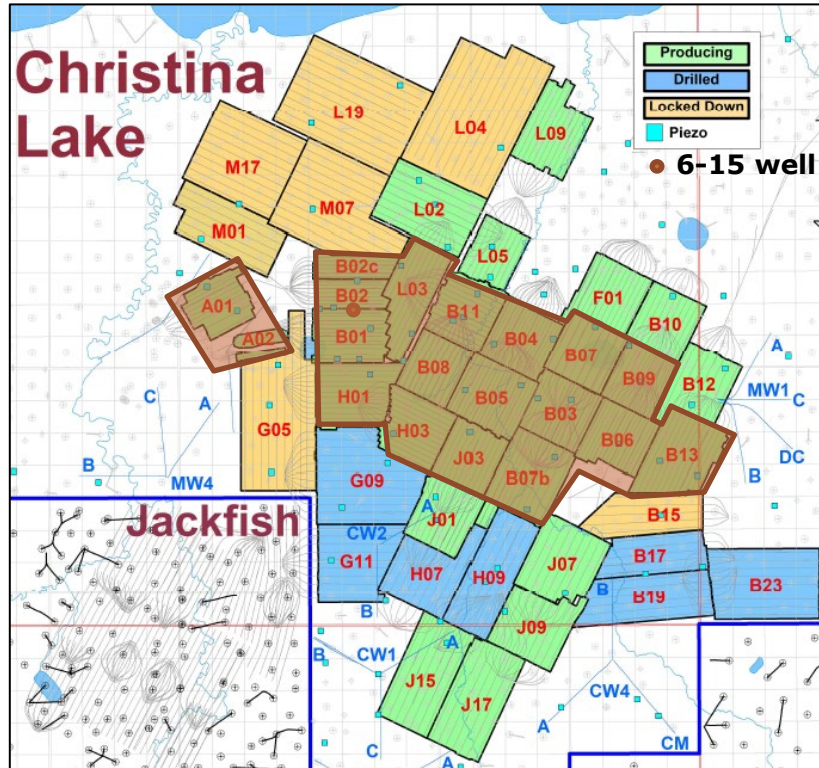
Reservoir Characteristics	Christina Lake Project Area	Kirby East Project Area	Approved Development Area
Reservoir Depth (m subsea)	170 - 245	170 - 245	170 - 245
Average SAGD Pay Thickness (m)	Up to 45+	Up to 25+	Up to 35+
Porosity (%)	31%	29%	30%
Horizontal Permeability (D)	Up to 10	Up to 8	Up to 10
Vertical Permeability (D)	Up to 7	Up to 6	Up to 7
Oil Saturation (%)	~80%	~75%	~80%
Water Saturation (%)	~20%	~25%	~20%
Original Reservoir Pressure (kPa)	~2500	~2500	~2500
Original Reservoir Temperature (°C)	12°C	12°C	12°C

POIP and RF per pad

Pad	Area (m2)	Height (m)	Porosity (%)	So (%)	POIP (Mm3)	Cum Oil (Mm3) to Dec 31, 2020	Recovery % POIP	Estimated Ultimate Recovery (m3)	Ultimate Recovery as % of POIP
A01 PAD	514,091	25	33%	77%	3,269	2,412	73.8%	2,443	74.7%
A02 PAD	174,358	31	32%	83%	1,375	607	44.1%	716	52.1%
B01 PAD	644,033	39	32%	79%	6,318	4,430	70.1%	4,561	72.2%
B02 PAD	329,864	44	32%	82%	3,798	3,078	81.0%	3,475	91.5%
B02C PAD	320,629	31	33%	83%	2,673	1,952	73.0%	1,997	74.7%
B03 PAD	677,534	42	32%	81%	7,155	5,763	80.6%	6,053	84.6%
B04 PAD	652,375	44	31%	80%	7,019	5,947	84.7%	6,061	86.3%
B05 PAD	731,534	49	31%	78%	8,503	6,400	75.3%	6,926	81.5%
B06 PAD	605,198	40	31%	75%	5,584	4,614	82.6%	4,834	86.6%
B07 PAD	642,341	49	31%	79%	7,690	5,643	73.4%	5,915	76.9%
B07B PAD	886,085	29	32%	77%	6,207	3,154	50.8%	4,146	66.8%
B08 PAD	568,267	37	33%	84%	5,782	3,982	68.9%	4,355	75.3%
B09 PAD	558,380	49	31%	82%	7,012	4,554	64.9%	5,061	72.2%
B10 PAD	595,522	37	31%	80%	5,526	1,966	35.6%	2,980	53.9%
B11 PAD	640,668	39	31%	81%	6,182	4,658	75.4%	4,683	75.8%
B12 PAD	652,771	26	29%	79%	4,001	444	11.1%	2,529	63.2%
B13 PAD	836,206	28	30%	78%	5,662	2,741	48.4%	3,562	62.9%
F01 PAD	700,230	32	30%	78%	5,303	3,477	65.6%	4,392	82.8%
H01 PAD	773,342	29	33%	82%	6,098	3,139	51.5%	4,264	69.9%
H03 PAD	658,249	29	34%	83%	5,224	2,900	55.5%	3,812	73.0%
H07 PAD	787,787	24	32%	83%	5,058	46	0.9%	3,310	65.4%
H09 PAD	934,727	27	33%	84%	7,070	128	1.8%	4,555	64.4%
J01 PAD	600,387	23	33%	77%	3,471	1,541	44.4%	2,409	69.4%
J03 PAD	561,300	43	33%	80%	6,312	4,351	68.9%	4,825	76.4%
J07 PAD	848,871	24	32%	82%	5,286	823	15.6%	4,002	75.7%
J09 PAD	758,451	28	32%	81%	5,518	1,092	19.8%	4,405	79.8%
J15 PAD	991,475	25	31%	80%	6,215	557	9.0%	3,783	60.9%
J17 PAD	992,561	21	33%	83%	5,735	393	6.9%	3,936	68.6%
L02 PAD	980,071	26	32%	82%	6,845	466	6.8%	3,874	56.6%
L03 PAD	716,007	31	34%	84%	6,294	2,764	43.9%	4,349	69.1%
L05 PAD	469,077	33	29%	77%	3,418	1,631	47.7%	2,241	65.6%
L09 PAD	754,344	29	31%	84%	5,727	1,778	31.0%	4,154	72.5%
Total CL	21,556,734				177,331	87,434	49.3%	128,605	72.5%

*As of December 31st, 2020

Map of co-injection wells



Non-condensable gas

- NCG injected in 6-15 well, and wells on A01, A02, B01, B02, B02C, B03, B04, B05, B06, B07, B07b, B08, B09, B11, B13, H01, H03, J03, and L03 pads

Solvent

- No solvent injection at CL, currently

Injection Strategy and Impacts

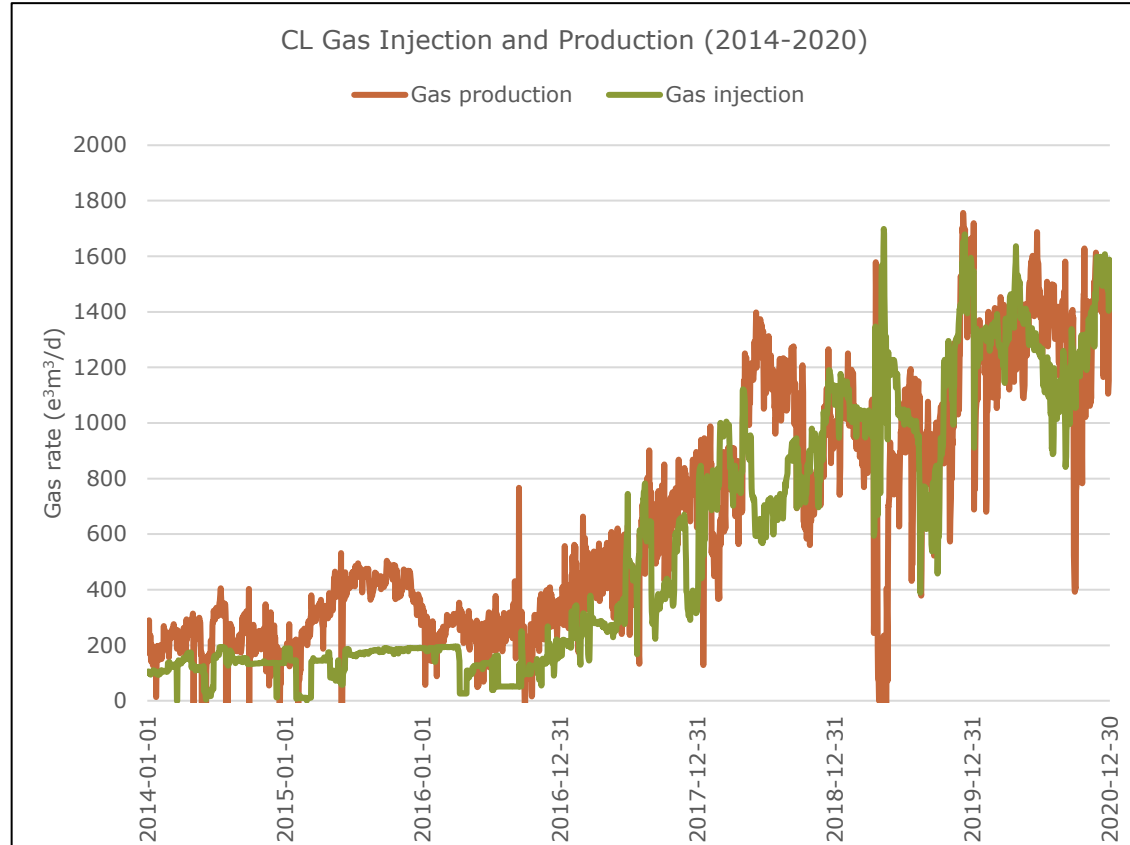
NCG Injection commencement is based on:

- Pads with high RF
- Pads with high SOR/declining oil rates

Steam cuts are typically made in 25% increments.

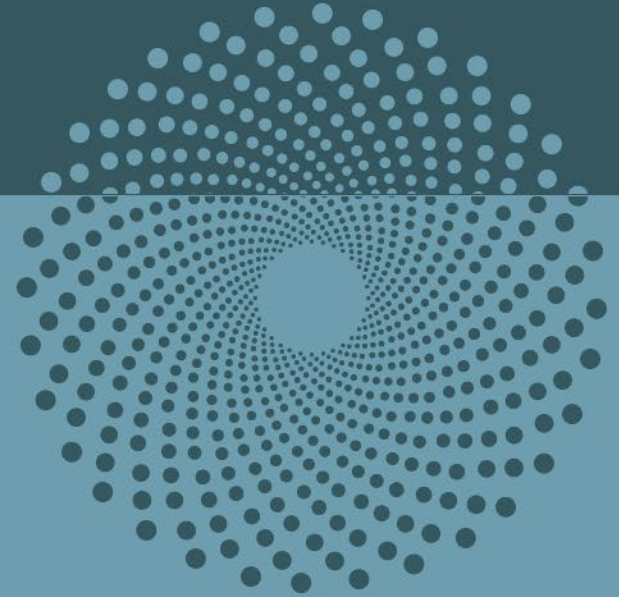
Impact of co-injection:

- Trials underway to optimize late life strategy and reduce gas production.
- Based on data to date, Cenovus does not expect material impact to ultimate recovery due to co-injection.










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Surface



Overall plot plan

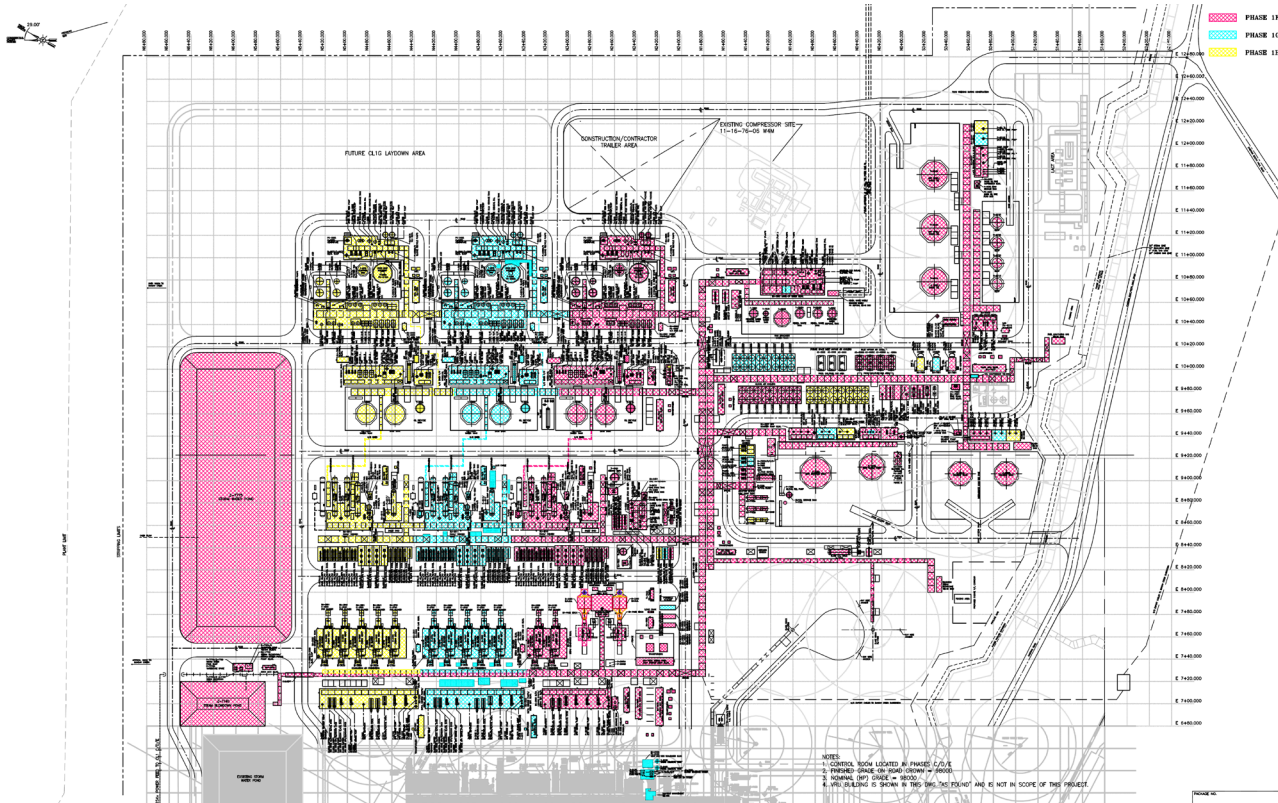


-  PHASE 1B
-  PHASE 1C
-  PHASE 1D
-  PHASE 1E
-  PHASE BB
-  PHASE 1F
-  PHASE 1G

All Phases indicated on Plot Plan have been built and in operation.

A high-resolution drawing has been included as an attachment (CL1-44-PLT-00-0010-002)

Plot Plan with Future Phase H



PHASE 1F

PHASE 1G

PHASE 1H

Phase H has not been constructed, nor in operation

Source Water Infrastructure

Fresh water source wells – Empress Aquifer :

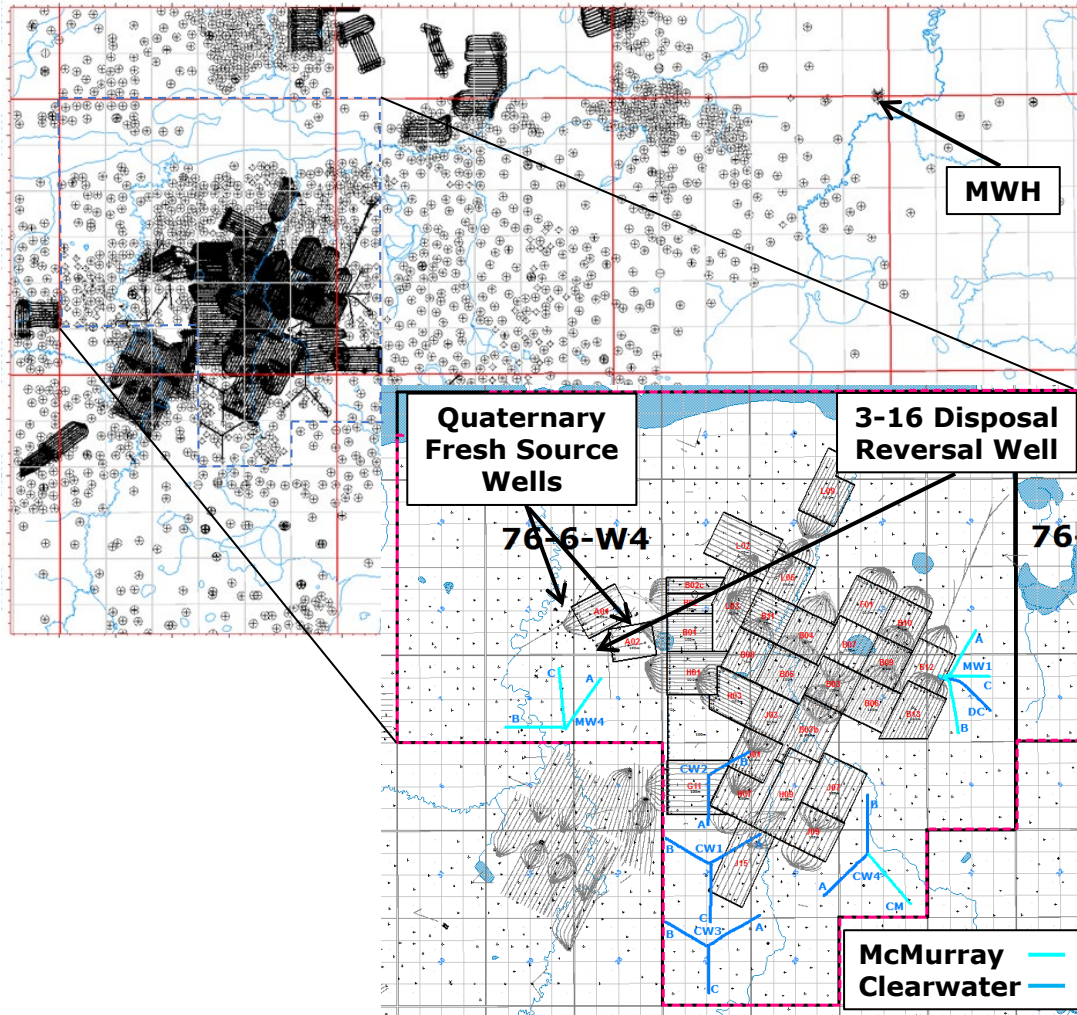
- Two wells at 09-17-076-06W4M (TDS ~440-560 mg/L)
- One well at 06-16-076-06W4M (TDS ~380-650 mg/L)

Brackish water source wells – Clearwater B Aquifer:

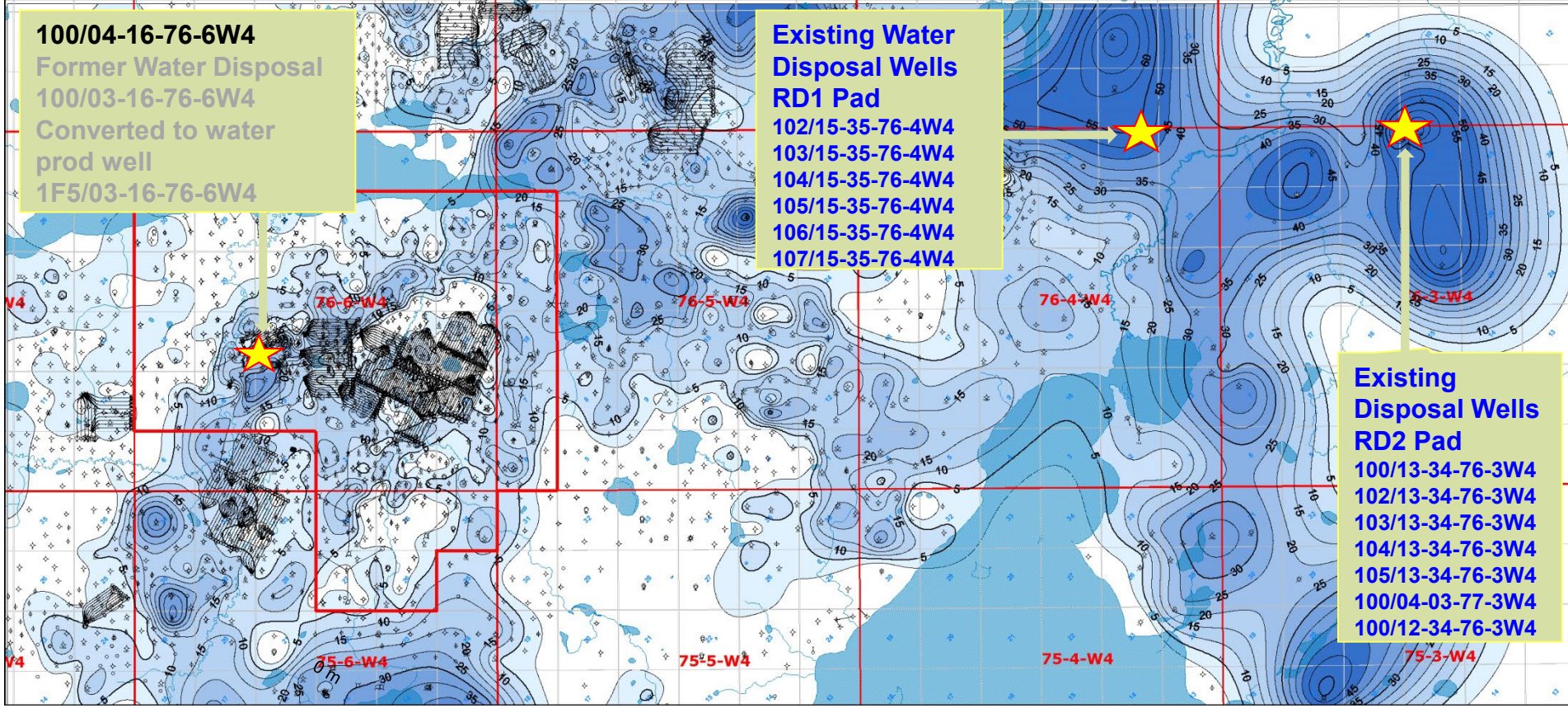
- CW1-A 1F1/13-35-075-06W4/00 TDS ~ 7,400 mg/L
- CW1-B 1F1/13-34-075-06W4/00 TDS ~ 5,070 mg/L
- CW1-C 1F1/15-27-075-06W4/00 TDS ~ 7,780 mg/L
- CW2-A 1F1/16-03-076-06W4/00 TDS ~ 4,600 mg/L
- CW2-B 1F1/02-03-076-06W4/00 TDS ~ 5,580 mg/L
- CW3-A 100/04-35-075-06W4/00 TDS ~ 9,730 mg/L
- CW3-B 100/13-27-075-06W4/00 TDS ~ 8,900 mg/L
- CW-3C 100/02-27-075-06W4/00 TDS ~ 11,700 mg/L
- CW4-A 1F1/01-35-075-06W4 TDS ~ 13,200 mg/L
- CW4-B 1F1/06-01-076-06W4 TDS ~ 8,800 mg/L
- MW1-DC 1F1/07-07-076-05W4 TDS ~ 4,300 mg/L

McMurray water source wells (Online Q4 2016):

- MW1-A 1F1/07-18-076-05W4 TDS ~ 16,880 mg/L
- MW1-B 1F1/03-07-076-05W4 (not in use) TDS ~ 16,520 mg/L
- MW1-C 1F1/09-07-076-05W4 TDS ~ 16,420 mg/L
- MW4-A 1F3/11-09-076-06W4 TDS ~ 10,850 mg/L
- MW4-B 1F1/04-08-076-06W4 TDS ~ 11,300 mg/L
- MW4-C 1F1/16-08-076-06W4 TDS ~ 10,990 mg/L
- CW4-C 1F1/01-36-075-06W4 TDS ~ 18,600 mg/L
- 3-16 1F5/03-16-076-06W4/00 TDS ~ 8,400 mg/L
- MWH 1F1/01-01-077-04W4 (not in use)
- MWH 1F1/02-01-077-04W4 (not in use) TDS ~ 13700-16800 mg/L
- MWH 1F2/01-01-077-04W4 (not in use)
- MWH 1F1/15-36-076-04W4 (not in use)
- MWH 1F1/16-36-076-04W4 (not in use)
- MWH 1F2/16-36-076-04W4 (not in use)



McMurray water disposal wells



100/04-16-76-6W4
 Former Water Disposal
 100/03-16-76-6W4
 Converted to water
 prod well
 1F5/03-16-76-6W4

**Existing Water
 Disposal Wells
 RD1 Pad**
 102/15-35-76-4W4
 103/15-35-76-4W4
 104/15-35-76-4W4
 105/15-35-76-4W4
 106/15-35-76-4W4
 107/15-35-76-4W4

**Existing
 Disposal Wells
 RD2 Pad**
 100/13-34-76-3W4
 102/13-34-76-3W4
 103/13-34-76-3W4
 104/13-34-76-3W4
 105/13-34-76-3W4
 100/04-03-77-3W4
 100/12-34-76-3W4

Facility summary

- No major modifications during reporting period due to facility throughput reductions in Q2 2020 (market conditions) and COVID
- Butane blending project on-line
 - Injected to displace diluent in sales oil while not exceeding vapour pressure specification
 - Truck unloading, butane bullets and pumping installed to deliver butane
 - Commissioned in November 2020, and optimized to displace 1.4 bbl diluent for every 1 bbl butane
 - Ongoing operations successful & actively monitoring butane blending rates & vapour pressure specifications

Plant performance

Steam

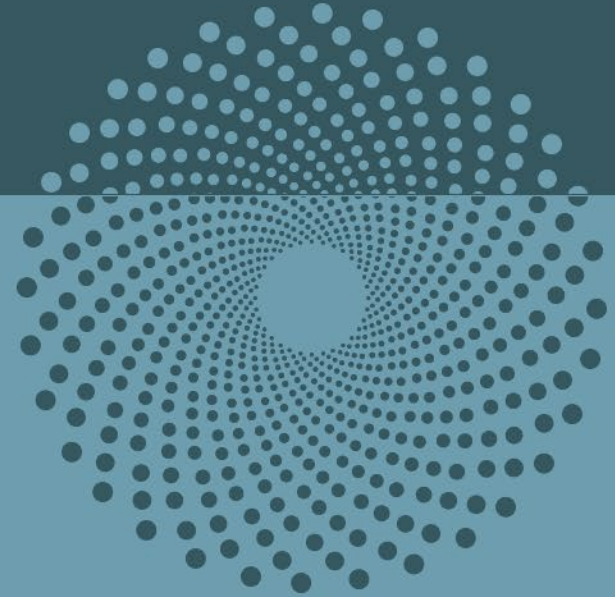
- System capacity 83,000 t/d of steam
- Average flowrate for 2020 of 71,495 t/d | 86% of Capacity
- Phase A to H approved steam capacity is 92,618 t/d

Oil

- System capacity 43,880 m³/d of oil (276,000 bbl/d)
- Average flowrate for 2020 of 34,714 m³/d (218,341 bbl/d) | 79% of Capacity
- Phase A to H approved annual average bitumen capacity is 49,284 m³/d (310,000 bbl/d)

Subsection 4.4 9-12

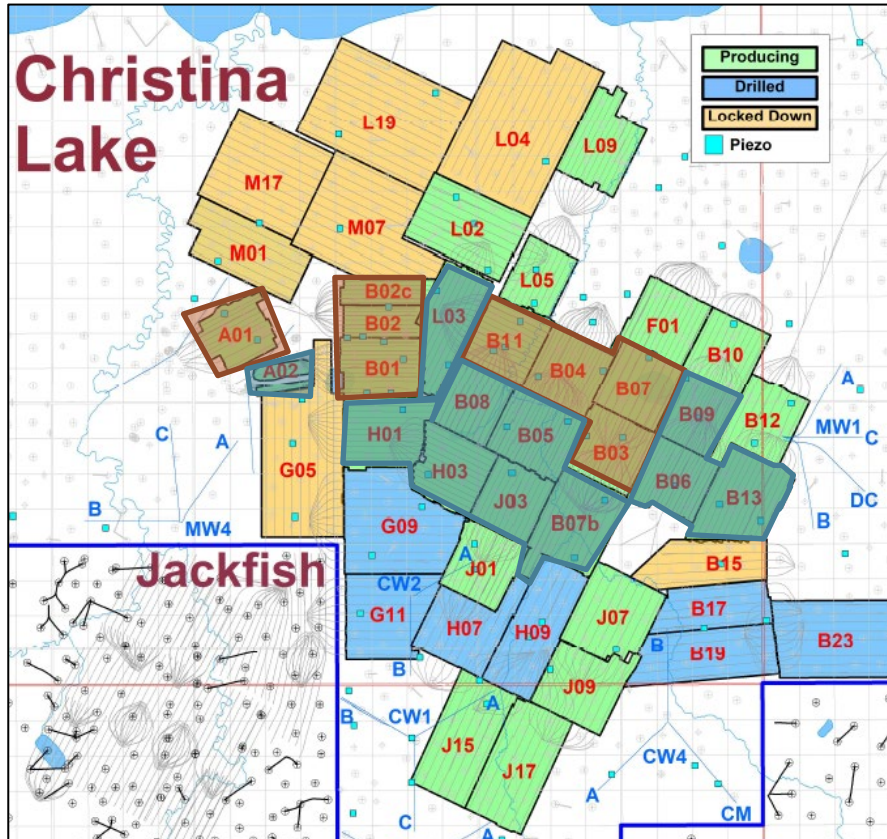
Historical and Upcoming Activity



Pad Abandonments

- No pad abandonments are currently planned at Christina Lake in the next 5 years.

Well patterns with active gas injection



2020 OSCA application/approval summary

Act	Application No.	Application Description	Approval Date
OSCA	1928177	G05 Pad Well Pair Trajectory Extension	2020-04-24 (Cat 1 Letter)
OSCA	1928178	Blowdown Optimization Trial Project (B10, L03, L05, J01 Pads)	2020-05-04 (8591NNN)
OSCA	1926944	Field Wide Circulation MOP Application	2020-05-07 (8591000)
OSCA	1928578	Butane Blending Facility – Phase 2	2020-05-13 (Cat 1 Letter)
OSCA	1928645	Field Wide Co-injection and Blowdown Strategy Update	2020-07-15 (8591PPP)
OSCA	1929401	Dilation Start-Up Application (B15, B17, B19, B23, G05, G09)	2020-09-15 (8591RRR)
OSCA	1930419	Upper McMurray Pay Well Trial	2020-12-14 (8591SSS)

2020 OSCA & EPEA application/approval summary

Act	Application No.	Application Description	Approval Date
OSCA/ EPEA	1929776/ 030-48522	Phase H Optimization Application (Cogen Addition)	EPEA Approval 2020-12-21 Scheme Approval 2021-01-13
EPEA	031-48522	EPEA Renewal Application	Submitted 2020-12-01

Facility modifications

- From March to June 2020 production curtailment affected emulsion, produced water and steam production volumes
- Between January 2020 to December 2020, there were no major facility modifications or expansions completed
- Phase A-B underwent a major turnaround outage in September to November 2020
- Equipment reliability issues, process upsets and unplanned outages in the Water Plant which occasionally limited the water balance in Q2 2020
- Phase CDE blowdown line was repaired in September 2020, impacted steam production

Facility performance

Process Treating Area:

- Production ramp up from December 2019 to March 2020
- Production ramp down from March 2020 to June 2020
- Produced Gas Capacity limitations:
 - Higher water saturation and H₂S concentration of the casing gas limits produced gas capacity
 - Additional PG cooling capacity required and being planned – expected to be online in 2021

Facility performance

Process Treating Area, (con't)

- Sales Oil / Slop Tank Venting from plant upsets
 - OTSG trips leads to produced gas system upsets from VRU system (ejectors)
 - Numerous venting events identified due to back-flow from low pressure VRU ejector system
 - The ejector systems' critical back pressure was being reached, leading to reverse flow of motive gas through the ejector backwards to the atmospheric storage tanks
 - Automated control logic developed & implemented to identify critical back pressure / reverse flow conditions and mitigate venting
 - Automated control logic solution has reduced frequency & duration of venting upsets

Facility performance

De-oiling Area:

- Slug Catcher liquids management into de-oiling
 - Monitoring of this system has been increased to reduce oil-in-water excursions
- On-going monitoring of oil-in-water excursions
- Skim Tank / De-Oiled Water Tank Venting from plant upsets
 - OTSG trips leads to produced gas system upsets from VRU system (ejectors – see previous slide comments)

Facility performance

Water Treatment Area:

- Reduced throughput resulted in lack of sufficient boiler feed water to generate the steam required to maintain well health/operation. Fresh water TDL (temporary diversion license) allowed increases to steam production:
 - 2,500 Sm³/d for the 9-17A/B fresh water wells / annual max. of 730,000 Sm³
 - 2,000 Sm³/d for the 6-16 fresh water wells / annual max. of 447,490 Sm³
- Equipment reliability issues, process upsets and unplanned outages occasionally limited total water plant capacity in Q2 2020:
 - May 2020 – Phase F WLS (T-0160) underwent an outage for repairs

Facility performance

Steam Generation Area:

- Reduced throughput resulted in lack of sufficient boiler feed water to generate the steam required to maintain well health/operation. Fresh water TDL (temporary diversion license) granted
- OTSG Failures
 - OTSG B-2460 radiant section tube failure in Q4 2019 and repaired
 - OTSG B-2300 convection section tube failure led to boiler being unavailable during repairs in March 2020. No impact to overall steam generation due to water balance.
- HRSG Upgrades
 - Upgraded metallurgy in B-3360/3460 as a result of historical tubes failures

Pilots/technical innovations

Butane Blending Project – displace diluent volumes to reduce Opex

- Phases 2/3 of trial commenced in Nov/Dec 2020
 - Increased injection capacity and monitoring capabilities

Tricanter Project – recycle slop water/slop oil

- Review undertaken in 2020-2021 to determine if additional trials or activities are recommended

Non-Condensable Gas Co-injection Trials:

- B13 Pad – terminated due to low liquid levels in producer B13P10 (gas breakthrough) caused by lower well depth of producer B13P09
- B07b Pad – trial is continuing with observed iSOR reduction
- L09 Pad – under evaluation for potential trial

2020 Non-compliance summary - AER

Date	Non compliance/Self Disclosure	Follow-up
2020-03-03	Waste Management Inspection @ 02-02-076-06W4. Debris from drilling activity stored at remote sump site.	Materials removed from sump and properly disposed of. Response letter submitted March 6, 2020.
2020-07-15	EDGE Ref #369056. Brackish water release at 01-17-076-06W4. Fatigue crack of block and bleed assembly.	Complete, assembly replaced. Response letter submitted Sept 18, 2020.
2020-11-20	EDGE Ref #374023. Boiler feedwater release @ 08-17-076-06W4 due to leaking valve.	Complete, repaired leaking gasket. Follow-up submitted Nov 26, 2020.
2020-12-03	EDGE Ref #374313. Gas release @ 15-11-076-06W4 due to leaking pig receiver.	Complete, pig receiver door o-ring replaced. Follow-up submitted Dec 8, 2020.
2020-12-12	EDGE Ref #374443. Regen/Raw water release @ 11-16-076-06W4 due inaccurate high level alarm during maintenance activities.	Complete, high level settings adjusted. Follow-up submitted Dec 13, 2020.
2020-12-25	EDGE Ref #374732. Produced water/crude oil release @ 12-18-076-05W4 due to leaking valve.	Follow-up in progress.

2020 Non-compliance Summary – EPEA

Date	Non compliance	Follow-up
2020-02-28	EDGE Ref# 364140. H ₂ S exceedance recorded at air monitoring station.	No cause determined. Continue to monitor results in relation to AAAQOs.
2020-04-20	EDGE Ref# 365458. CEMS unit B-3500 failed to meet 90% availability due to temperature probe circuit board failure.	Replaced temp probe circuit board.
2020-10-20	EDGE Ref# 372958. GasTec tubes used to quantify H ₂ S and SO ₂ emissions while on site GC was off-line (not ISO accredited).	ISO accredited GC brought back on-line.
2020-12-23	EDGE Ref# 374732. GasTec tubes used to quantify H ₂ S and SO ₂ emissions while on site GC was off-line (not ISO accredited).	ISO accredited GC brought back on-line.

Future plans

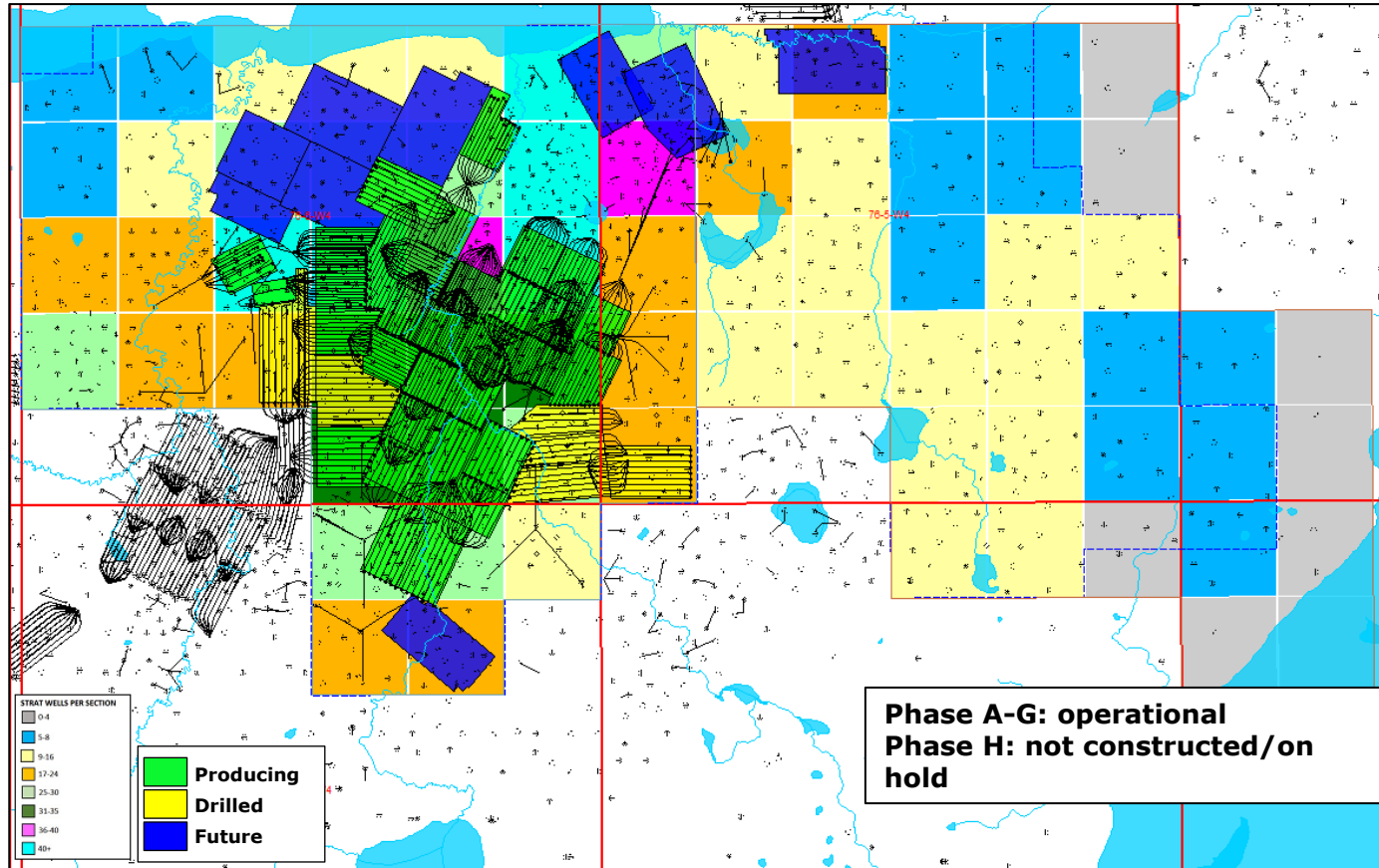
Potential Future Applications

- Brackish Water Debottleneck
- Casing Gas Re-injection at Well Pads
- Narrows Lake tie-back

Future Plant Activity

- On-going evaluation of optimization and debottleneck projects
- Phase H (not constructed) is on hold – the project will be re-initiated upon future review

Planned development



Questions

please contact us

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